

# **Cholera**

## **Bioterrorism Agent Profiles for Health Care Workers**

### **Causative Agent:**

*Vibrio cholerae* is a motile, gram negative, non-sporulating rod. Two serogroups have been identified as causing symptoms in humans: O1 and O139. These organisms grow best at a pH of 7.0 but are able to tolerate an alkaline environment. Rather than invading the intestinal mucosa, they adhere to it, and the clinical syndrome is caused by the action of the cholera toxin.

### **Route of Exposure:**

Ingestion of contaminated food or water

### **Infective Dose & Infectivity:**

10 to 500 organisms

### **Incubation Period:**

The incubation period for cholera ranges from four hours to five days with an average of 2-3 days.

### **Clinical Effects:**

Cholera is an acute infectious illness characterized by sudden onset of vomiting, abdominal distension, headache and pain with little or no fever. These symptoms are followed rapidly by profuse watery diarrhea with a "rice water" appearance (colorless with small flecks of mucous). Fluid loss may exceed five to ten liters a day, and death can result from dehydration, hypovolemia and shock. In children, coma, seizures and hypoglycemia can occur.

### **Lethality:**

If appropriately treated the mortality rate is 3-30%. However, if untreated the mortality rate rises to 50-80%.

### **Transmissibility:**

Cholera is not easily spread from person to person, so in order to be an effective biological weapon, major drinking water supplies would need to be heavily contaminated.

### **Primary contamination & Methods of Dissemination:**

Dissemination would be through fecal contamination of food or water supply.

### **Secondary Contamination & Persistence of organism:**

Diarrheal fluids are highly infective, however, the organism is easily killed by desiccation. It is not viable in pure water but will survive up to 24 hours in sewage and as long as six weeks in water containing organic matter. *Vibrio cholerae* can also withstand freezing for 3 to 4 days.

### **Decontamination & Isolation:**

**Patients-** Patients with cholera should be managed using contact precautions. No decontamination or isolation of patients is necessary.

**Equipment, clothing & other objects-** *Vibrio cholerae* is readily killed by dry heat at 117° C, steam, boiling or by short exposure to ordinary disinfectants and chlorination of water.

**Outbreak control:**

Quarantine is unnecessary. Any person who shared food or drink with a cholera patient should be under surveillance for five days, and objects contaminated with feces or vomitus should be disinfected prior to reuse. Feces and vomitus do not need to be disinfected if discharged into a normal sewage disposal system.

**Personal Protective Equipment:**

**Prehospital:** Gloves, Eye Protection or Face Shield, Mask, Gown

**Health Care Facility:** Standard Precautions with Contact Precautions for diapered or incontinent children <6 years of age for duration of illness. Hand washing is of particular importance in preventing transmission and/or autoinoculation.

**Treatment:**

Treatment of cholera infection is through oral or parenteral rehydration therapy for dehydration. Antibiotics can be used to shorten the duration of the diarrhea and the shedding of the organism. Oral tetracycline 50 mg/kg/day with a maximum of 2 gm/day in four divided doses for 3 days or doxycycline 6 mg/kg with a maximum of 300 mg as a single dose should be used. The risk of teeth staining with the use of tetracyclines in children under the age of eight is not a problem due to the short course of therapy. Tetracycline-resistant strains of cholera are prevalent. If patients are found to be infected with a tetracycline-resistant strain, ciprofloxacin 500 mg every 12 hours for 3 days or erythromycin 500 mg every 6 hours for 3 days can be used.

**Prophylaxis:**

Although a vaccine exists, it is not recommended because of only partial efficacy. Household contacts with a high likelihood of secondary transmission may receive oral tetracycline 50 mg/kg/day with a maximum of 2 gm/day in four divided doses for 3 days or doxycycline 6 mg/kg with a maximum of 300 mg as a single dose. Mass antibiotic prophylaxis of whole communities is never indicated and can lead to antibiotic resistance.

**Differential Diagnosis:**

The differential diagnosis for *V. cholerae* includes Enterotoxigenic *E. coli*, and *Vibrio parahaemolyticus*.

**References:**

Chin, James. *Control of Communicable Diseases Manual*, Seventeenth Edition, American Public Health Association, 2000.

Kortepeter M, Christopher G, Cieslak T, et al. *Medical Management of Biological Casualties Handbook*, U.S. Army Medical Research Institute of Infectious Diseases, U.S. Department of Defense, February 2001.

Available at <http://www.nbc-med.org/SiteContent/HomePage/WhatsNew/MedManual/Feb01/handbook.htm>. Accessed September 2001.

Sidell FR, Takafuji ET, Franz DR. *Military Aspects of Chemical and Biological Warfare*. Office of the Surgeon General, U. S. Army. Borden Inst., WRAMC, 1997.

**Developed by: Arizona Department of Health Services & Samaritan Regional Poison Center**  
20 July 2001